

DQA:

Date: 14/03/05



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed:

Date: 14-2-78

Work Order update only ☐

Work Order: 112416	DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Suspected Unapproved <input type="checkbox"/>	AGAINST DEPARTMENT/PROCESS			
Part No. 2432-3		Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>
NCR No. 14-3571		Machining <input checked="" type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>
		Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>
		Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design	14/02/26	130	X2	#1 - Undersized Dim. .950 is actually .930 + .03 - .01	A.P. 14.02.26	#1 acceptable since section along centerline would experience higher loads resulting from its smaller X section. ∴ acceptable by comparison	MH 14/02/26 A.P. 14.02.26	conf 14/02/26	DAS 27 9-89 14/2/26
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup	X			#2 - Undersized Dim. .250 .250 ± .01 is actually .230		#2 acceptable, see loss of strength calculation attached			
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric <input type="checkbox"/> Cracks <input type="checkbox"/> Crimp/Kink/Ripple/Wave <input type="checkbox"/> Cuffs <input type="checkbox"/> Crushing <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Marks/Chatter <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damage/Defect <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drawing <input type="checkbox"/> Drill Holes <input type="checkbox"/> Finish <input type="checkbox"/> Fit/Function	<input type="checkbox"/> Folio/Program <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete/Unqualified <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Misaligned/off center <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Off-set <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence	<input type="checkbox"/> Outside Dimensions <input checked="" type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge	<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Set-up <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other
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Work Order ID 112416

January-30-14 11:42:43 AM

112416

Page 2

Item ID: D2432-3 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: 206 (24") Bearpaw
Start Date: 1/30/14 Start Qty: 4.00 ***4*** Cust Item ID:
Required Date: 1/30/14 Req'd Qty: 4.00 ***4*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	QC8- Inspect parts - second check	0.00							
150									
QC	Memo	0.00							
Quality Control									
160	Identify as per dwg & Stock Location: _____	0.00							
160									
Packaging	Memo	0.00							
Packaging									
170	QC21- Final Inspection - Work Order Release	0.00							
170									
QC	Memo	0.00							
Quality Control									

MLF
14-2-26

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Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
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Picklist Print

January-30-14 11:42:43 AM

Page 1

Work Order ID: 112416

Parent Item: D2432-3

Start Date: 1/30/14

Required Date: 1/30/14

Parent Item Name: 206 (24") Bearpaw

Start Qty: 4.00

Required Qty: 4.00

Comments: IPP REV:A AS PER REV G 12-07-24 JLM VERIFIED BY:DD IPP REV:B 12.10.17 AS PER
DWG REV.H DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
MUHMWB10		Purchased	No			120	sf	841.7082	3.7	14.8 15			JM14-02-21
UHMW 1" Black - 48"x120"													
Tivar Mfg.#52480104													
				<u>Location</u>		<u>Loc Qty</u>	<u>Loc Code</u>						
				MAT018		841.7082							
				121278		9.6282							
				122575		47.6							
				123229		53							
				123949		6.96							
				124758		17.52							
				m127891		145							
				m128011		162							
				m128092		400							
				128267				128267.					

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Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
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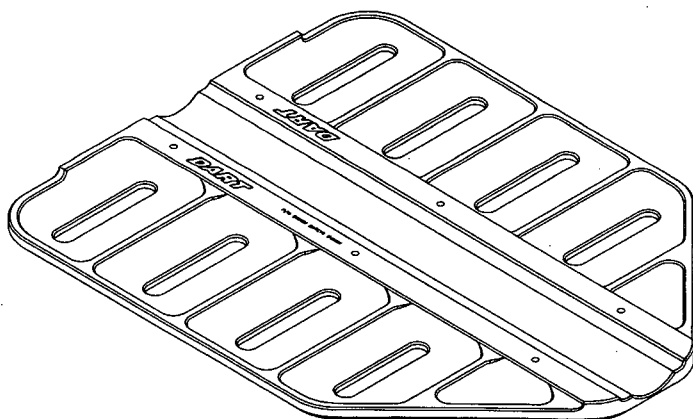
DART AEROSPACE LTD	Work Order: 112416
Description: Bearpaw	Part Number: D2432
Inspection Dwg: D2432-3 Rev: H	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

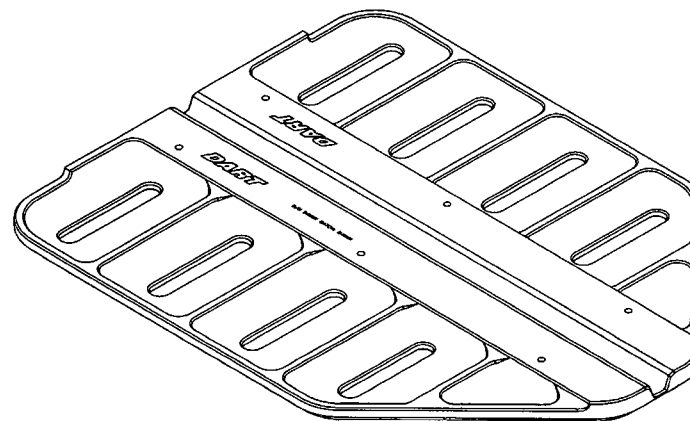
Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
0.063 x 45°	+0.030/-0.010	.065	✓		MH-04	Caliper
5.500	+/-0.030	5.500	✓			
0.200	+/-0.030					
0.25 x 45°	+/-0.030	.260 x 45°	✓			
R0.250	+/-0.030	.250	✓		rad gauge	
0.250	+/-0.010	.255	✓		MH-04	Caliper
0.625	+/-0.030	.640	✓			
0.375	+/-0.010	.380	✓			
0.950	+0.030/0.010	.940	✓			
19.000	+/-0.030	19.00	✓		MH-07	Tape
3.28 1.4	+/-0.030	1.370	✓			
3.28 .58	+/-0.030	.500	✓			
Ø0.260	+0.005/-0.000	.260	✓			
Ø0.93	+/-0.030	.928	✓			
0.30	+0.030/-0.000	.305	✓		MH-07	Tape
23.750	+/-0.030	23.75	✓		MH-04	Caliper
4.250	+/-0.010	4.28	✓			
2.000	+/-0.030	2.012	✓			
9.000	+/-0.010	9.000	✓		CNC-02	Caliper
9.000	+/-0.010	9.000	✓		CNC-02	Caliper
0.375	+/-0.010					
0-38	+0.030/-0.010	.410	✓		MH-04	Caliper

Measured by: MH	Audited by: <i>[Signature]</i>	Preliminary Approval:
Date: 14/02/26	Date: 14/02/26	Date:

Rev	Date	Change	Revised by	Approved
A	04.01.09	New Issue P/O D206-559-015	KJ/RF	
B	12.07.31	Dwg Rev updated	KJ	
C	12.10.26	Dwg Rev updated	KJ	
D	13.07.18	Dimension 7.375 removed	KJ <i>[Signature]</i>	<i>[Signature]</i>



D2432F BEARPAW

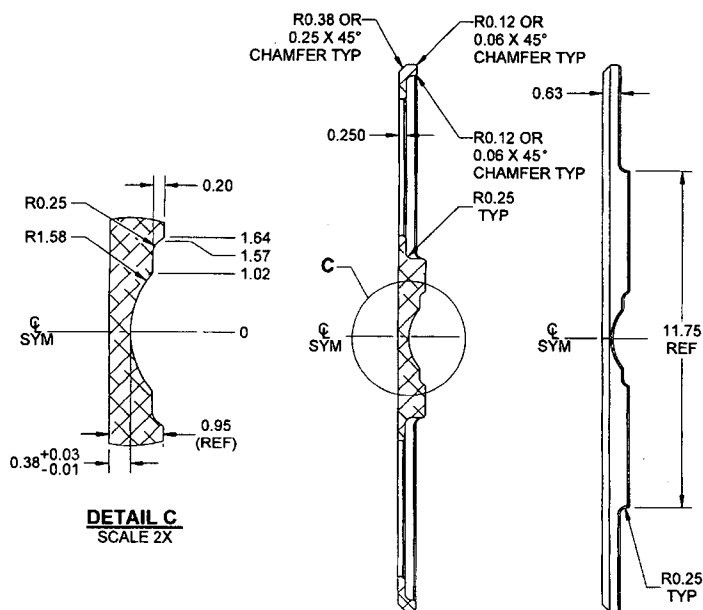


D2432-3 BEARPAW

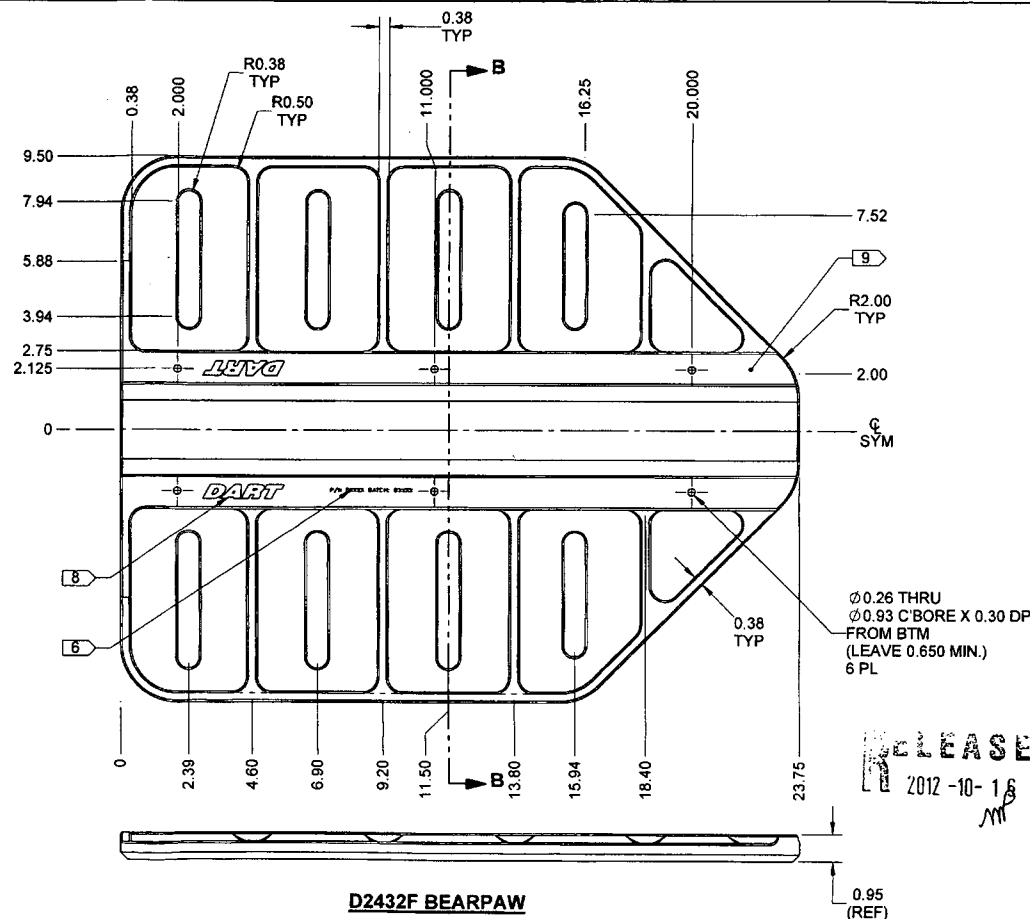
SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 112416M
14-01-31

RELEASED
2012-10-16

H	RIB HEIGHTS CHANGED TO CONDITION OF REV. F. SEE REV. F FOR DETAILS.	AP	12.09.24
G	UPDATE DRAWING FORMAT, REMOVED D2432B, ADD D2432-3, ADDED DIMENSION 7.52 (D1-2)	AP	12.05.02
F	CHANGE C'BORE, ADD B AND F P/N	-	98.05.12
E	CHANGE C'BORE DEPTH, BORE RADIUS	-	97.02.27
D	MOVE SLOT	-	96.06.04
C	CHANGE BORE AND C'BORE DEPTH	-	96.03.26
B	RE-DESIGN	-	96.01.24
A	NEW ISSUE	-	95.10.31
REV.	DESCRIPTION	BY	DATE
DESIGN	LE	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D2432 TITLE BEARPAW COPYRIGHT © 1996 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS APPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DRAWN	AP		
CHECKED	ASS		
MFG. APPR.	91		
APPROVED	140		
DE APPR.	140	REV. H SHEET 1 OF 3 SCALE NTS	
DATE	12.09.24		



SECTION B-B

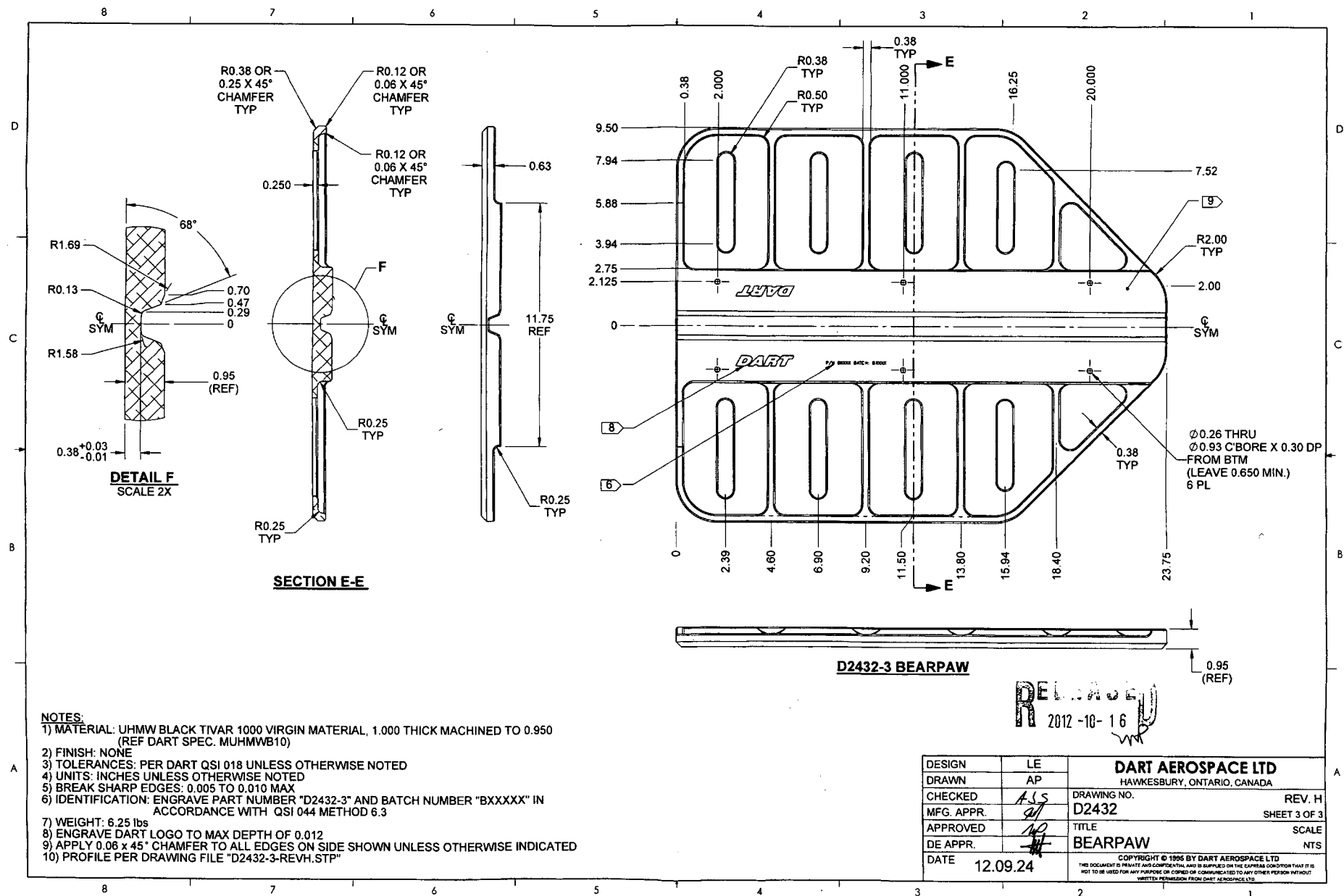


D2432F BEARPAW

NOTES:

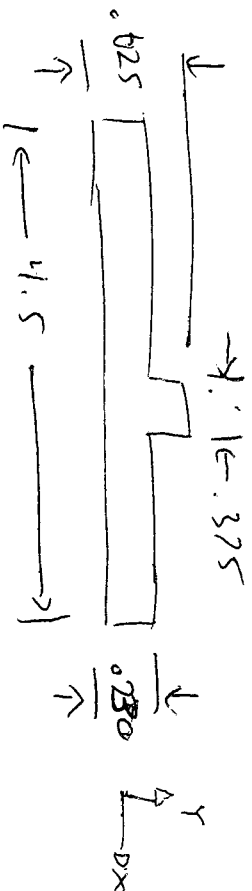
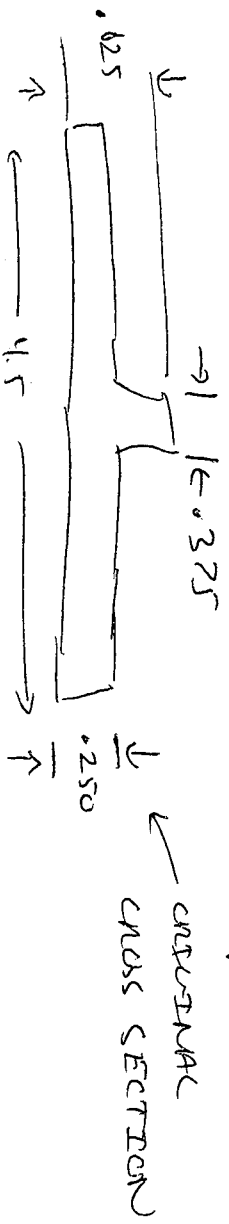
- 1) MATERIAL: UHMW BLACK TIVAR 1000 VIRGIN MATERIAL, 1.000 THICK MACHINED TO 0.950 (REF DART SPEC. MUHMWB10)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: ENGRAVE PART NUMBER "D2432" AND BATCH NUMBER "BXXXXX" IN ACCORDANCE WITH QSI 044 METHOD 6.3
- 7) WEIGHT: 5.87 lbs
- 8) ENGRAVE DART LOGO TO MAX DEPTH OF 0.012
- 9) APPLY 0.06 x 45° CHAMFER TO ALL EDGES ON SIDE SHOWN UNLESS OTHERWISE INDICATED
- 10) PROFILE PER DRAWING FILE "D2434F-REVH.STP"

DESIGN	LE	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	AP		
CHECKED	AS	DRAWING NO.	REV. H
MFG. APPR.	AT	D2432	SHEET 2 OF 3
APPROVED	140	TITLE	SCALE
DE APPR.	140	BEARPAW	NTS
DATE	12.09.24	COPYRIGHT © 1995 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



Qx for Section of Pocket

Alex Phaurand
14.02.26



MOMENTS OF INERTIA (PER AXIS)

$$I_{\text{original}} = 0.0197 \text{ in}^4$$

$$I_{\text{DEVIATED}} = 0.0191 \text{ in}^4$$

NEURAL AXIS ORIGINAL SECTION

$$Y_+ = 0.1547 \text{ in} \quad (\text{Per SR350-578 Rev A})$$

$$Y_c = .4653 \text{ in} \quad (\text{Per SR350-578 Rev A})$$

NEURAL AXIS DEVIATED SECTION (Per Axb CAD)

$$Y_+ = 0.1541 \text{ in}$$

$$Y_c = 0.4709 \text{ in}$$

AREA OF CROSS SECTION

$$A_{\text{original}} = 1.265 \quad (\text{Per SR350-578 Rev A})$$

$$A_{\text{DEVIATED}} = 1.176 \quad (\text{Per Axb CAD})$$

Shear stress

$$F_s_{\text{original}} = \frac{3616 \text{ rev}}{1.265} = \frac{3616 \text{ rev}}{1.265} \quad (\text{Per SR350-578 Rev A})$$

Shear stress

$$F_s_{\text{original}} = 1.78 \quad (\text{Per SR350-578 Rev A})$$

$$F_s_{\text{deviated}} = 1.91 \text{ # } 16 \text{ #/in}^2$$

(7% loss of strength acceptable due to flexibility of)

bending stress ~~original~~ ^{original} (Per SRS50-SR Rev. A)

$$(T) \sigma_{\text{original}} = \frac{M Y}{I} = \frac{(703) (.1597)}{0.0197} = 5,699$$

$$(C) \sigma_{\text{original}} = \frac{(703) (.4653)}{0.0197} = 16,604$$

bending stress de-rated

$$(T) \sigma_{\text{de-rated}} = \frac{(703) (.1541)}{(0.0191)} = 5,672 \quad (\text{negligible loss of strength})$$

$$(C) \sigma_{\text{de-rated}} = \frac{(703) (.4709)}{(0.0191)} = 17,332 \quad (4\% \text{ loss of strength})$$

The above shows loss of strength is acceptable due to UHMW flexibility, load transfer will not be significantly affected.